

CLAIMS

1. A method of detecting a Region of Interest in an image data set, especially digitalized X-ray image, the method comprising the steps of:
 - 5 a. extracting phase information from the image data,
 - b. using said phase information for differentiating between different lines and edges, and
 - c. skewing said lines towards a centre.
- 10 2. The method of claim 1, wherein said step a. comprises extracting an orientation estimate.
3. The method of claim 1, wherein said step b. comprises additional information on a magnitude from a filter answer.
- 15 4. A method for detection of stellate lesions in a digitalized mammogram, the method comprising the following steps:
 - a. obtaining an image data corresponding to said mammogram (901);
 - 20 b. obtaining an image mask (902);
 - c. substantially uniformly sampling (903) the digital image inside said mask and producing sample points;
 - d. calculating (904) for each sample point a characteristic;
 - e. selecting (905) a number of sampling points most likely to correspond to a spiculated lesion;
 - 25 f. applying (906) a segmentation procedure to the original digital image at said selected sampling points;
 - g. extracting (907) new characteristics from each segmented area and obtaining a feature vector;
 - 30 h. classifying (908) each feature vector as suspicious or non-suspicious using a classification machine; and
 - i. examining (909) said suspicious areas.
5. The method of claim 4 wherein said characteristics in said step d comprises one or several of:
 - 35 - contrast,
 - two measures of spiculatedness, and

two measures of edge orientations.

- 5 6. The method of claim 5 wherein said contrast, is derived as a ratio between an intensity inside a circle with a radius r_1 and a washer shaped background area with inner radius r_1 and an outer radius r_2 .
- 10 7. The method of claim 5 wherein said two measures of spiculatedness are derived from a histogram of angle differences obtained using a filtration method that yields phase information together with orientation estimates.
8. The method of claim 5, wherein said two measures of edge orientations are derived from a histogram of angle differences obtained using a filtration method that yields phase information together with orientation estimates.
- 15 9. The method of claim 4, wherein said step e is provided using a support vector machine or an artificial neural network.
10. The method of claim 5, wherein said classification of each feature vector is provided using a classification machine.
- 20 11. The method according to any of claims 4-9, wherein the entire image is sampled.
12. The method of claim 4, wherein each node in the applied sampling grid is evaluated in terms of contrast and spiculation.
- 25 13. An arrangement (800) for detecting a Region of Interest in an image data set, especially digitalized X-ray image, which arrangement extracts phase information from said image, uses said phase information for differentiating between different lines and edges, and skews said lines towards a centre, the arrangement comprising: a processing unit (801), a module (802) for obtaining image masks, a sampling module (803), a calculating module (804), filtration module (805), a classification module (806) and a support vector machine and/or artificial neural network module (807).
- 30 14. The arrangement of claim 13, wherein said filtration module is a set of quadrature-filter.
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15. An x-ray apparatus comprising an arrangement according to any of claims 11-12.

5 16. A computer unit comprising a processing unit, a memory unit, storage unit, said computer unit being operatively arranged with an instruction set to acquire an image data set, especially digitalized x-ray image, said instruction set having procedures for: detecting a Region of Interest in a said image data, extracting phase information from said image, obtaining image masks, sampling,
10 calculating, filtration, a classification and supporting vector and/or artificial neural network.

17. A computer program for detection of stellate lesions in a digitalized mammogram, the program comprising:

- 15 - an instruction set for obtaining an image data corresponding to said mammogram;
- an instruction set for obtaining an image mask;
- an instruction set for substantially uniformly sampling the digital image inside said mask and producing sample points;
- 20 - a calculation procedure for each sample point a characteristic;
- an instruction set for selecting a number of sampling points most likely to correspond to a spiculated lesion;
- an instruction set for applying a segmentation procedure to the original digital image at said selected sampling points;
- 25 - an instruction set for extracting new characteristics from each segmented area and obtaining a feature vector; and
- classifying procedure for classifying each feature vector as suspicious or non-suspicious using a classification machine.